

## CLAIMS

5 What is claimed is:

1. A nozzle attachment for removing residual material from the discharge end of a nozzle and for quick attachment and detachment from the nozzle, the attachment comprising:

10 an attachment assembly of components being separable for cleaning;  
an internal gas passageway in the attachment assembly between adjacent assembled components thereof and having an inlet to receive an incoming gas stream;

15 a discharge end on the attachment assembly to emit a gas stream from the internal gas passageway in a direction angled inwardly and downwardly relative to the discharge end of the nozzle to remove residual material from the nozzle; and  
a manual quick release connection operable manually without the use of a tool to connect and disconnect the nozzle attachment from the nozzle.

20 2. A nozzle attachment in accordance with claim 1, wherein the assembly of parts comprises:

separable nested components defining the gas passageway being axially separable from one another without the use of a tool and completely dismantlable for inspection and cleaning of each nested component.

25 3. A nozzle attachment in accordance with claim 1, wherein the manual quick release connection comprises a clamping retainer for clamping onto the nozzle.

30 4. A nozzle attachment in accordance with claim 3, wherein the clamping retainer comprises a split ring and manual operable threaded members to tighten the split ring about the nozzle.

5. A nozzle attachment in accordance with claim 4, wherein the manual operable threaded members comprise wing nuts.

6. A nozzle attachment in accordance with claim 3, wherein the clamping  
5 retainer onto a clamp attaching portion on the nozzle.

7. A nozzle attachment in accordance with claim 6, wherein the clamping  
retainer is provided with substantially annular surfaces for cooperating with the  
annular clamp attaching portion on the dispensing nozzle.

10 8. A nozzle attachment in accordance with claim 1, further comprising a quick  
connect and disconnect device for detachable connecting an air inlet line to the  
nozzle attachment.

15 9. A nozzle attachment for attachment to a dispensing nozzle to deliver a  
discharge gas stream across a face of a discharge nozzle to remove residual  
material therefrom comprising:

a retainer on the nozzle attachment for releasably attaching to a nozzle;

an outer nozzle component in the attachment device;

20 an inner nozzle component nested in the outer nozzle component and  
cooperating therewith to define a gas passageway therebetween;

the inner and outer nozzle components being mounted by the retainer on the  
nozzle and being axially separable from one another for cleaning of the inner and  
outer nozzle components; and

25 inclined, spaced discharge surfaces at discharge ends of the nested inner  
and outer components to direct inclined inwardly and downwardly to create a  
discharging gas and a shearing force on the residue at the discharge end of the  
nozzle to remove residual material from the nozzle.

10. A nozzle attachment in accordance with claim 9, wherein the retainer comprises:

a clamp for clamping for detachably connecting the nozzle attachment to the nozzle.

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11. A nozzle attachment in accordance with claim 9, wherein the inner nozzle component is nested within the outer component and separable in an axial direction therefrom for cleaning.

10 12. A nozzle attachment in accordance with claim 9, wherein the retainer having a quick connect and disconnect device for detachably attaching the nozzle attachment to the nozzle to facilitate attachment and removal of the nozzle attachment for cleaning.

15 13. A nozzle attachment in accordance with claim 12, further comprising:  
a quick connect and disconnect device for detachably connecting an air inlet line to the nozzle attachment.

14. A method of providing and cleaning a nozzle attachment for removing residual material from a dispensing nozzle comprising:  
20 providing a nozzle attachment having an air inlet to receive pressurized air, an internal gas passageway for gas to flow through the nozzle attachment and a discharge for discharging gas to create shear forces to remove residual material from the nozzle;

25 encircling the nozzle with a clamping device on the nozzle attachment device;

manually operating a quick connect and disconnect device to attach the nozzle attachment to the nozzle;

30 dispensing material through the nozzle and flowing gas through the gas internal passageways and discharging gas to create the shear forces to remove residual material from the nozzle; and

manually operating the quick connect and disconnect to detach the nozzle attachment from the nozzle for cleaning.

15. A method in accordance with claim 14, further comprising:  
separating nested inner and outer components of the nozzle attachment in  
an axial direction without the use of a tool for cleaning of the components.

5 16. A method in accordance with claim 14, further comprising operating the  
dispensing in compliance with U.S.D.A. 3-A sanitary application requirements.

17. A nozzle attachment for removing residual material retained on the  
dispensing nozzle of a fluid dispenser, comprising (a) a retainer adapted to  
10 releasably attach the nozzle attachment to a dispensing nozzle, and (b) a pair of  
annular nozzle attachment components that define, when nested together, an  
intervening space operable as a gas passageway into which pressurized gaseous  
fluid can be introduced and directed to a discharge opening provided at a lower  
axial end of the nested nozzle attachment components, wherein the gas  
15 passageway is adapted to emit gas introduced into the gas passageway as a gas  
stream in a direction angled inwardly and downwardly relative to a discharge end of  
the dispensing nozzle effective to create a shearing force at the discharge end of  
the nozzle that dislodges and blows off any residual material clinging to the  
discharge end after a prior dispensing operation or cycle.

20 18. The nozzle attachment according to claim 17, wherein the pair of annular  
nozzle attachment components comprise:

- i) an outer nozzle attachment component comprising a first hollow-  
bodied portion having an inner surface with an inner diameter, and a flanged  
25 surface at one axial end thereof and an inward-facing beveled surface at the other  
axial end thereof, and further including a gas inlet adapted to receive pressurized  
gas through the first hollow-bodied portion;
- ii) an inner nozzle attachment component including a second hollow-  
bodied portion having an outer surface with an outer diameter that is smaller than  
30 the inner diameter of the outer nozzle attachment component, and a collar  
extending radially outward at one axial end and an outward-facing beveled surface  
at the other axial end thereof, wherein the inner nozzle attachment component  
being adapted to be nested within the outer nozzle attachment component by

positioning of the collar of the inner nozzle attachment component on the flanged surface of the outer nozzle attachment component effective to define an upper gas passageway between the outer surface of the inner nozzle attachment component and the inner surface of the outer nozzle attachment component that is in  
5 communication with the gas inlet of the outer nozzle attachment component, and to define a lower gas passageway including a discharge opening between the outward-facing beveled surface of the inner nozzle attachment component and the inward-facing beveled surface of the outer nozzle attachment component wherein the lower gas passageway is in fluid communication with the upper gas  
10 passageway and is adapted to emit gas introduced into the nozzle attachment at an inward and downward angle relative to the discharge end of the nozzle to create a shearing force at the discharge end of the nozzle; and

wherein the retainer is adapted to releasably retain the outer nozzle attachment component while the inner nozzle attachment component is nested  
15 therein, and concurrently provide releasable mechanical connectivity to the nozzle.

19. The nozzle attachment according to claim 18, wherein the first hollow-bodied portion is a first cylindrical portion, and the second hollow-bodied portion is a second cylindrical portion.

20. The nozzle attachment according to claim 18, wherein the outer nozzle attachment component comprises an upper flanged surface adapted to be sealingly engaged and held to a surface of the retainer.

21. The nozzle attachment according to claim 18, further comprising a ferrule releasably attachable to the gas inlet of the outer nozzle attachment component adapted to provide fluid communication between the gas inlet and an external source of pressurized fluid.

22. The nozzle attachment according to claim 18, wherein the outward-facing beveled surface of the inner nozzle attachment component and the inward-facing beveled surface of the outer nozzle attachment component are inclined at an absolute angle value of greater than 90 degrees and less than 180 degrees.

23. The nozzle attachment according to claim 18, wherein the outward-facing beveled surface of the inner nozzle attachment component and the inward-facing beveled surface of the outer nozzle attachment component are inclined at an absolute angle value of about 125 to about 160 degrees.

24. The nozzle attachment according to claim 18, wherein the retainer comprises a clamp including a wing nut operable to tighten or loosen the connection to a valve nozzle.

25. The nozzle attachment according to claim 18, wherein the discharge opening comprises a substantially continuous ringed opening adapted to encircle the nozzle.

26. A fluid dispenser for use in intermittent dispensing operations, comprising:  
a dispenser body including a fluid inlet communicating with a fluid passageway;  
a discharge nozzle having a discharge end from which fluid is dispensed;

a valve stem positioned within the fluid passageway adapted to be controllably moved vertically up and down within the fluid passageway by an actuator;

a valve head located in the discharge end of the discharge nozzle, wherein the valve head is positionable in a sealing relationship with interior walls of the fluid passageway in the discharge end of the nozzle during non-dispensing operational times, and adapted to be moved vertically downward by the valve stem out of sealing relationship with the fluid passageway in the discharge nozzle during dispensing operational times such that fluid fed into fluid passageway can pass by the valve head and exit from the discharge end of the nozzle;

a nozzle attachment attached to the nozzle, comprising (a) a retainer adapted to releasably attach the nozzle attachment to a dispensing nozzle, and (b) a pair of hollow-bodied nozzle attachment components that define, when nested together, an intervening space operable as a gas passageway into which

pressurized gaseous fluid can be introduced and directed to a discharge opening provided at a lower axial end of the nested nozzle attachment components, wherein the gas passageway is adapted to emit gas introduced into the gas passageway as a gas stream in a direction angled inwardly and downwardly relative to a discharge  
5 end of the dispensing nozzle effective to create a shearing force at the discharge end of the nozzle that dislodges and blows off any residual material clinging to the discharge end after a prior dispensing operation or cycle.

27. The fluid dispenser according to claim 26, wherein the pair of hollow bodied  
10 nozzle attachment components comprise:

(a) an outer nozzle attachment component comprising a first hollow-bodied portion having an inner surface with an inner diameter, and a flanged surface at one axial end thereof and an inward-facing beveled surface at the other axial end thereof, and further including a gas inlet adapted to receive pressurized gas  
15 through the annulus portion;

(b) an inner nozzle attachment component including a second hollow-bodied portion having an outer surface with an outer diameter that is smaller than the inner diameter of the outer nozzle attachment component, and a collar extending radially outward at one axial end and an outward-facing beveled surface at the other axial  
20 end thereof, wherein the inner nozzle attachment component being adapted to be nested within the outer nozzle attachment component by positioning of the collar of the inner nozzle attachment component on the flanged surface of the outer nozzle attachment component effective to define an upper gas passageway between the outer surface of the inner nozzle attachment component and the inner surface of  
25 the outer nozzle attachment component that is in communication with the gas inlet of the outer nozzle attachment component, and to define a lower gas passageway including a discharge opening between the outward-facing beveled surface of the inner nozzle attachment component and the inward-facing beveled surface of the outer nozzle attachment component wherein the lower gas passageway is in fluid  
30 communication with the upper gas passageway and is adapted to emit gas introduced into the nozzle attachment at an inward and downward angle to create a shearing force at the discharge end of the nozzle; and

wherein the retainer is adapted to releasably hold the outer nozzle

attachment component while the inner nozzle attachment component is nested therein, and concurrently provide releasable mechanical connectivity to the nozzle.

28. The fluid dispenser according to claim 27, wherein the valve head has a truncated cone shape having increasing diameter nearer the discharge end of the nozzle and smaller diameter further from the discharge end of the nozzle, wherein the valve head has a first diameter adapted to seal with the passageway to stop fluid flow out of the discharge end of the nozzle when the valve stem is sufficiently upraised, and a second diameter, smaller than the first diameter, in which a gap is provided between the second diameter and passageway when the valve stem is sufficiently lowered to permit flow of fluid.

29. The fluid dispenser according to claim 28, wherein the first hollow-bodied portion is a first cylindrical portion, and the second hollow-bodied portion is a second cylindrical portion.

30. The fluid dispenser according to claim 28, wherein the outer nozzle attachment component comprises an upper flanged surface adapted to be sealingly engaged and held to a surface of the retainer.

31. The fluid dispenser according to claim 28, further comprising a ferrule releasably attachable to the gas inlet of the outer nozzle attachment component adapted to provide fluid communication between the gas inlet and an external source of pressurized fluid.

32. The fluid dispenser according to claim 28, wherein the outward-facing beveled surface of the inner nozzle attachment component and the inward-facing beveled surface of the outer nozzle attachment component are inclined at an absolute angle value of greater 90 degrees and less than 180 degrees.

33. The fluid dispenser according to claim 28, wherein the outward-facing beveled surface of the inner nozzle attachment component and the inward-facing beveled surface of the outer nozzle attachment component are inclined at an



absolute angle value of about 125 to about 160 degrees.

34. The fluid dispenser according to claim 28, wherein the retainer comprises a clamp including a wing nut operable to tighten or loosen the connection to a valve  
5 nozzle.

35. The fluid dispenser according to claim 28, wherein the discharge opening comprises a substantially continuous ringed opening adapted to encircle the  
10 nozzle.

36. A fluid dispenser for use in intermittent dispensing operations, comprising:  
a dispenser body including a fluid inlet communicating with a fluid  
passageway, and a discharge nozzle having a discharge end from which fluid is  
dispensed;

15 a valve stem positioned within the fluid passageway adapted to be controllably moved vertically up and down within the fluid passageway by an actuator;

a valve head located in the discharge end of the discharge nozzle, wherein the valve head has a truncated cone shape having increasing diameter axially nearer the discharge end of the nozzle and smaller diameter axially further  
20 from the discharge end of the nozzle, wherein the valve head has a first diameter adapted to seal with the passageway to stop fluid flow out of the discharge end of the nozzle when the valve stem is sufficiently vertically upraised, and a second diameter, smaller than the first diameter, in which a gap is provided between the  
25 second diameter and passageway when the valve stem is sufficiently vertically lowered to permit flow of fluid out of the discharge end of the nozzle;

a nozzle attachment releasably attached to the nozzle, and concentrically surrounding the nozzle, wherein the nozzle attachment including an internal gas passageway for receiving pressurized gas and a discharge opening in  
30 fluid communication with the gas passageway adapted to direct the pressurized gas at an inward and downward angle relative to the discharge end of the nozzle.

37. A method for cleaning a discharge nozzle of a fluid dispenser, comprising:

1) providing a dispenser, including:

a dispenser body having a fluid inlet communicating with a fluid passageway, and a discharge nozzle having a discharge end from which fluid is dispensed;

a valve stem positioned within the fluid passageway adapted to be controllably moved vertically up and down within the fluid passageway by an actuator;

a valve head located in the discharge end of the discharge nozzle, wherein the valve head has a truncated cone shape having increasing diameter axially nearer the discharge end of the nozzle and smaller diameter axially further from the discharge end of the nozzle, wherein the valve head has a first diameter adapted to seal with the passageway to stop fluid flow out of the discharge end of the nozzle when the valve stem is sufficiently vertically upraised, and a second diameter, smaller than the first diameter, in which a gap is provided between the second diameter and passageway when the valve stem is sufficiently vertically lowered to permit flow of fluid out of the discharge end of the nozzle;

a nozzle attachment releasably attached to the nozzle, and concentrically surrounding the nozzle, wherein the nozzle attachment comprises (a) a retainer adapted to releasably attach the nozzle attachment to a dispensing nozzle, and (b) a pair of hollow-bodied nozzle attachment components that define, when nested together, an intervening space operable as a gas passageway into which pressurized gaseous fluid can be introduced and directed to a discharge opening provided at a lower axial end of the nested nozzle attachment components, wherein the gas passageway is adapted to emit gas introduced into the gas passageway as a gas stream in a direction inwardly and downwardly relative to a discharge end of the dispensing nozzle;

2) dispensing fluid from the dispenser via the discharge end of the nozzle;

3) removing residual fluid from the discharge end of the nozzle by introducing pressurized air into the gas passageway of the nozzle attachment effective to be emitted from the discharge opening of the nozzle attachment and creates a sufficient shearing force at the discharge end of the nozzle to dislodge the residual fluid from the discharge end of the nozzle.